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A NEW SPECIES OF GALL MIDGE (DIPTERA: CECIDOMYIIDAE) DAMAGING BRANCH SHOOTS OF THE DRYLAND TEA-TREE, *MELALEUCA LANCEOLATA* (MYRTACEAE)

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Summary

KOLESIK, P. & PEACOCK, D. E. (1999) A new species of gall midge (Diptera: Cecidomyiidae) damaging branch shoots of the dryland tea-tree, *Melaleuca lanceolata* (Myrtaceae). *Trans. R. Soc. S. Aust.* **123**(3), 115-119, 30 November, 1999.

A new species of gall midge, *Lopesia quadrata*, is described from *Melaleuca lanceolata* Otto in South Australia. The infested branch shoots are transformed into pine cone-like galls and do not develop further. The larva, pupa, male and female of the new species are described and illustrated. The new gall midge, only the second record of the tribe Lopesiini in Australia, is compared to other known gall midges from *Melaleuca* spp.

KEY WORDS: Diptera, Cecidomyiidae, *Melaleuca lanceolata*, South Australia.

Introduction

The dryland tea-tree, *Melaleuca lanceolata* Otto (Myrtaceae), also known as Moonah or black tea-tree, is a shrub or a small tree of up to 10 m in height occurring in Western Australia, South Australia, Victoria, New South Wales and Queensland (Barlow 1986). It grows in various habitats, in South Australia commonly in saline heavy clays that are subject to periodic waterlogging. The durable wood is occasionally used in the timber industry and the flowering trees are valued by beekeepers (Cunningham *et al.* 1981).

The gall midge modifies branch shoots of *M. lanceolata* subsp. *lanceolata* into galls that resemble pine cones (Fig. 1). The galls were collected by one of us (DEP) in October, 1998 in the Coorong National Park during a South Australian Animal and Plant Control Commission ecological survey. Although the galls were found in low abundance the gall midge can potentially have a severe impact on tree development because it prevents the growth of new branches.

The new gall midge, to be attributed to Kolesik, is placed in the genus *Lopesia* and becomes the second known Australian species of the tribe Lopesiini, along with *Austrolopesia melaleucae* Kolesik (1999) that forms flower galls on *Melaleuca halmaturorum* F. Muell. ex Miq. in South Australia.

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Fig. 1. Branch shoot gall of *Lopesia quadrata* sp. nov. on *Melaleuca lanceolata*. Arrow marks pupal skin. Scale bar = 10 mm.

Materials and Methods

Branch galls on *Melaleuca lanceolata* were collected at the Coorong National Park on 5.x.1998. The galls were processed in one of two ways. Some were peeled open and the larvae preserved in 70% ethanol. Those remaining were kept in plastic bags and the larvae were reared to adults. Pupation took place within the galls. Emerged adults were preserved together with their pupal skins in 70% ethanol. Microscope mounts of the type series were prepared according to the technique outlined by Kolesik (1995). The type series and other material retained in 70% ethanol, together with dried galls, are deposited in the South Australian Museum, Adelaide (SAMA), the Australian National Insect Collection, Canberra (ANIC) and the State Herbarium of South Australia, Adelaide (AD). Descriptions and measurements refer to the holotype and paralypes.

Genus *Lopesia* Rübsaamen, 1908

Lopesia Rübsaamen, 1908: 29

Type species. *Lopesia brasiliensis* Rübsaamen, 1908: 30, figs 11, 12

Lopesia is a genus of the supertribe Cecidomyiidi originally characterised by the bend in the R_5 wing vein at its juncture with R_5, R_5 situated beyond the midlength of R_1, toothed tarsal claws, empodia shorter than claws, short female postabdomen with large cerci, and four-segmented palpi. It is currently used as a catch-all genus within the tribe Lopesiini and now also includes species with simple tarsal claws and a reduced number of palpal segments (Gagné & Marohasy 1993; Gagné & Hibbard 1996). The new species fits *Lopesia* s.s. in all characters except the two-segmented palpi, a reduction that appears independently in many genera and does not preclude placing the species within the wider concept of the genus.

Lopesia quadrata sp. nov.
(FIGS 1 - 16)

Holotype: ♂, Coorong National Park, "Loop Road", South Australia (36° 11' S, 139° 41' E), 8.x.1998, reared by P. Kolesik from branch shoot galls on *Melaleuca lanceolata* Otto subsp. *lanceolata*, gall collected 5.x.1998 by D. E. Peacock, I21427 (SAMA).

Paratypes: 1 ♂, 2 ♀♀, 3 pupal skins (SAMA, I21428-I21432), 2 ♂♂, 2 ♀♀, 3 pupal skins (ANIC), same data but emerged 8.x.-23.x.1998, 1 larva (SAMA, I21433), 1 larva (ANIC), collected with holotype.

Other material: 20 ♀♀, 3 pupal skins, same data as paratypes (SAMA), galls, same data (AD9992623).

Male (Figs 2 - 8)

Colour: eyes black, head dark-brown, antennae and palpi brown, thorax black dorsally and red elsewhere, abdomen with sclerotised parts brown and unsclerotised parts red, genitalia brown, legs brown and yellow.

Head: Antenna: scape slightly longer than wide; pedicel spheroid; flagellomeres 12 in number, binodal, with one circumfila on basal node, two on distal, circumfilar loops not reaching the next distal circumfilum, nodes with sparse, short setulae, last flagellomere with small, apical nipple. Eye facets closely adjacent except at vertex where sparser, eye bridge 3 facets long. No postvertical protuberance. Palpi two-segmented, segmentation weak. Frons with 5 - 9 setae per side. Labella hemispherical, each with 6 - 9 short setae.

Thorax: Wing length 2.3 mm (range 2.2 - 2.4, n = 4), width 0.9 mm (0.8 - 0.9), R_5 varies between barely visible to full strength vein. Tarsal claws curved beyond midlength, with short, wide tooth, empodia less than half claw length.

Abdomen: Sternum I not sclerotised, asetose, sternites II - VIII with anterior pair of trichoid sensilla, posterior setal row and sparse setae scattered elsewhere. Tergites I - VII with anterior pair of trichoid sensilla, posterior setal row and sporadic setae elsewhere, tergum VIII not sclerotised, asetose. Genitalia: gonocoxite cylindrical, with large, rounded, setulose mesobasal lobe; gonostylus slightly tapered distally, bent at distal third, slightly swollen and setulose on basal third, asetose and ridged beyond; aedeagus with several asetose papillae, longer than gonocoxites, robust, tapered distally; hypoproct bilobed, each lobe with several setae, setulose; cerci bilobed, shorter than hypoproct, each lobe with several setae, setulose.

Female (Figs 9 - 12)

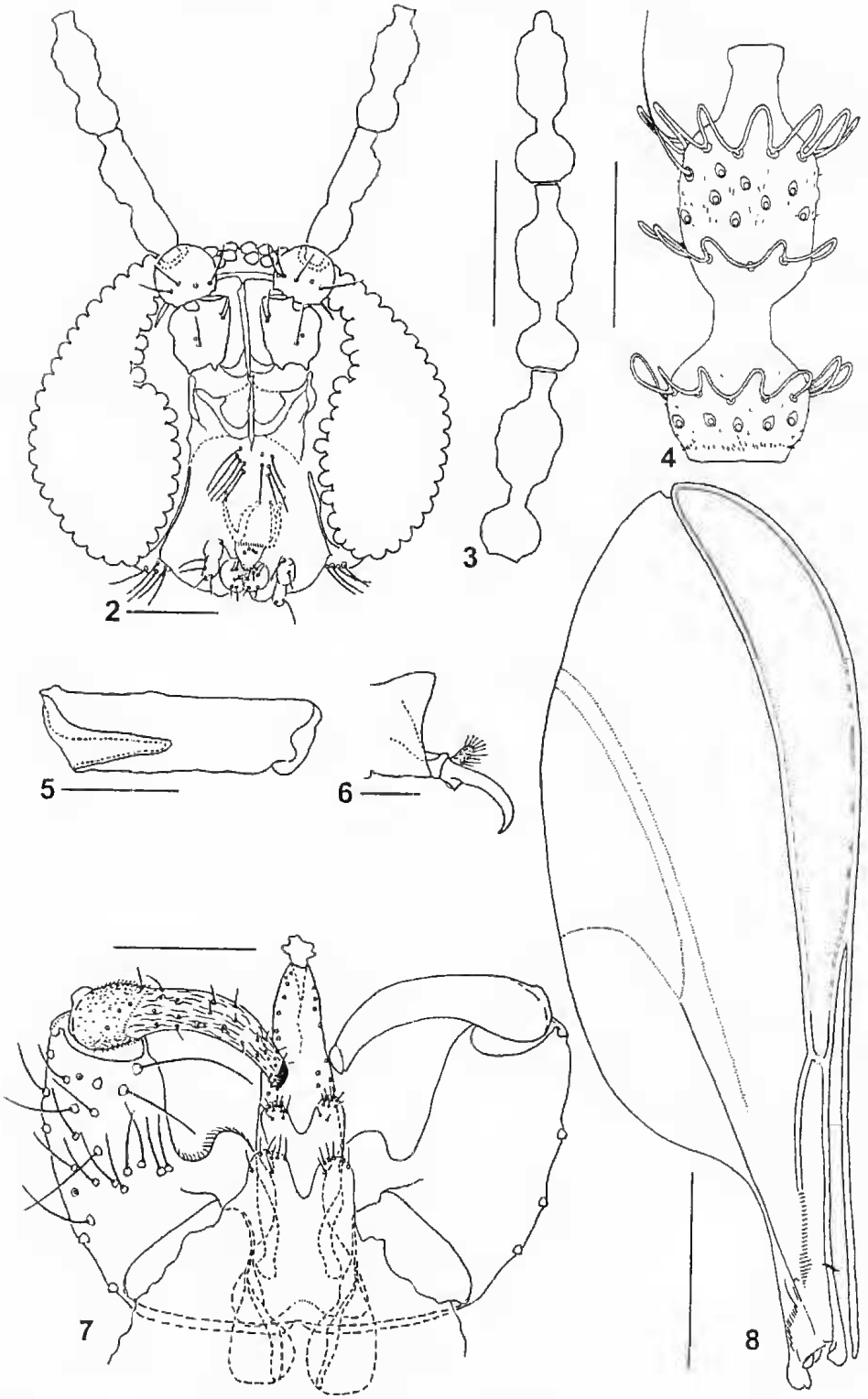
Colour as in male. Head: frons with 7 - 8 setae, labella each with 3 - 7 setae; flagellomeres cylindrical, with slight restriction at midlength in basal ones, circumfila simple around midlength, with several small, interconnected arches distally, setulae short and spare basally, unusually long and dense distally. Wing length 2.6 mm (2.3 - 2.8, n = 4), width 1.0 mm (0.9 - 1.0). Abdomen sternum VIII and IX not sclerotised, setose; tergite VIII consisting of two small areas, one on each side of centre, tergum IX sclerotised, both setose. Ovipositor short, barely protrusible; cerci ovoid, completely setulose and setose, several setae on posteroventral surface thick; hypoproct short, robust, with several setae, setulose. Other characters as in male.

Pupa (Figs 13, 14)

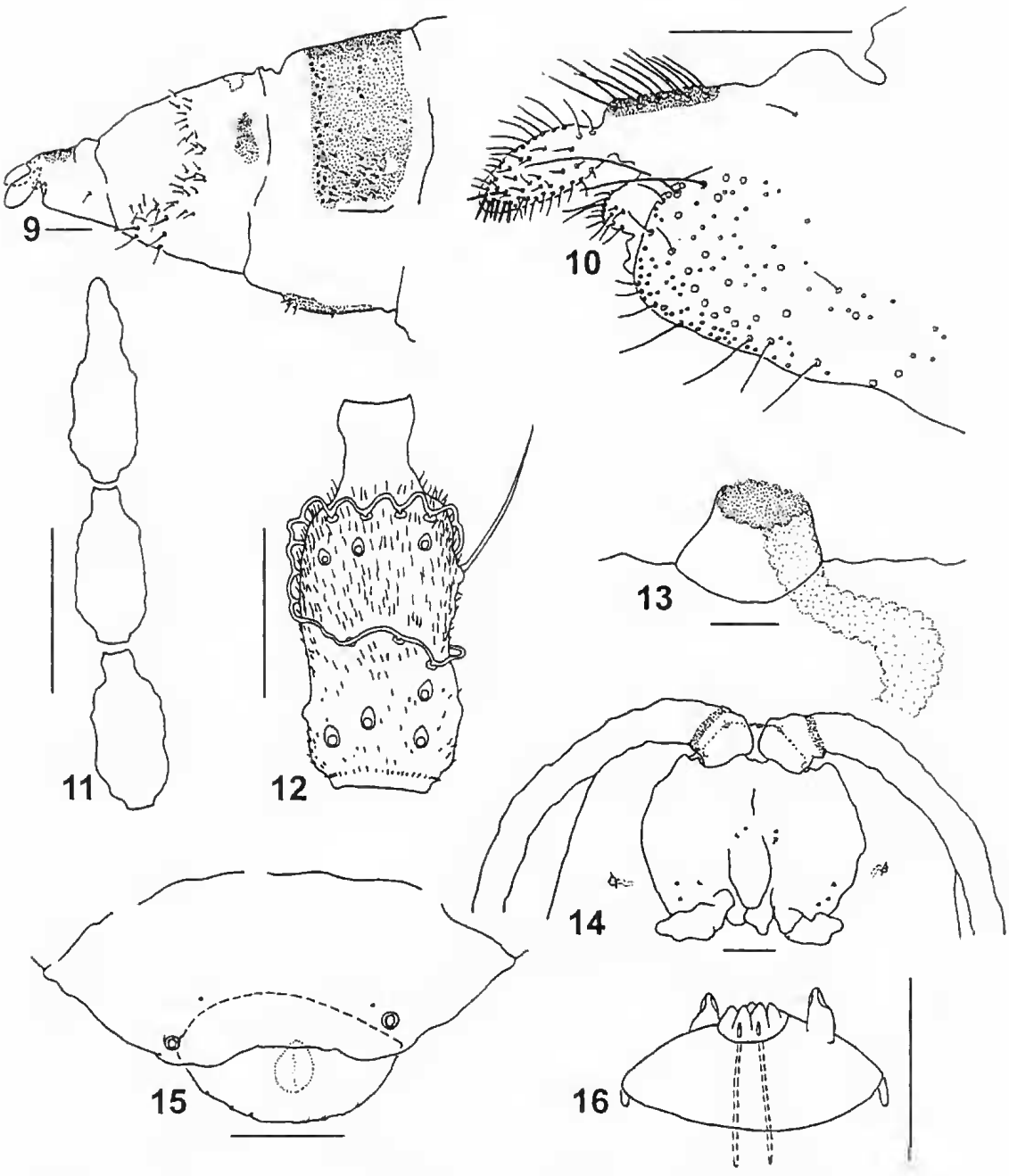
Colour: narrow ring on anterior part of antenna pale brown, remaining parts grey. Length 2.6 mm (2.3 - 2.8, n = 6). Cephalic papillae 5 µm (4 - 5) long. Frons on each side, one of two facial papillae setose, one of three lateral papillae setose, all setae minute. Prothoracic spiracle very short, as long as wide. No dorsal abdominal spines.

Larva (Figs 15, 16)

Colour: orange-red. Length 1.5 - 1.9 mm (n = 2). Head: antennae unusually broadened basally, posterolateral apodemes very short. No sternal spatula. Terminal segment with several small, asetose papillae.



Figs 2 - 8. Male of *Lopesia quadrata* sp. nov. Fig. 2. Head in frontal view. Fig. 3. Last three flagellomeres. Fig. 4. Sixth flagellomere. Fig. 5. First tarsomere. Fig. 6. Tarsal claw and empodium. Fig. 7. Genitalia in dorsal view. Fig. 8. Wing. Scale bars = 100 µm 2, 3, 7; 50 µm 4 -6; 500 µm 8.



Figs 9 - 16. *Lopesia quadrata* sp. nov. 9 - 12 female, 13, 14 pupa, 15, 16 larva. Fig. 9. End of abdomen in lateral view (setation on segment IX and ovipositor omitted). Fig. 10. Ovipositor in lateral view. Fig. 11. Last three flagellomeres. Fig. 12. Sixth flagellomere. Fig. 13. Prothoracic spiracle. Fig. 14. Anterior part in ventral view. Fig. 15. Last two abdominal segments in dorsal view. Fig. 16. Head in ventral view. Scale bars = 100 µm 9 - 11, 14, 15; 50 µm 12, 16; 10 µm 13.

Egg

Elongate-ovoid, red in colour.

Etymology

The name *quadrata* is a Latin adjective for "square", referring to the shape of the gall in the top side view.

Gall and biology

The midge transforms a branch shoot into a pine cone-like gall (Fig. 1), 3 - 9 mm long and 4 - 6 mm wide, square in the side top view; outer leaflets hard and brown in colour, inner ones soft and yellow-green, all sparsely covered with short, silvery hairs. Each gall contains one larva dwelling between two closely appressed leaflets. Pupation takes place inside the gall. At the end of its development the pupa lifts 2/3 of its body outside the gall. Shortly afterwards the pupal skin splits open at the dorsal part of the thorax and the adult emerges. At the beginning of October 1998, at the Coorong National Park, the gall midge population consisted mainly of pupae with only a small proportion of larvae. Of 11 examined *Melaleuca lanceolata* trees, six had galls of the new species. The tree with the highest infestation was 5 m high with a canopy of 4 m and bore about 200 galls.

Remarks

Previously, five cecidomyiids have been known to induce galls on *Melaleuca* spp. Gagné *et al.* (1997) described four species: *Lophodiplosis bidentata* Gagné from rosette bud galls on *M. quinquenervia* (Cav.) S. T. Blake, *L. cornuata* Gagné from trumpet-shaped leaf galls on *M. nervosa* (Lindley) Cheel, and *M. viridiflora* Sol. ex Gaertner, *L. indentata* Gagné from blister galls on leaves of *M. quinquenervia*, *M. dealbata* S. T. Blake, *M. viridiflora*, *M. arcana* S. T. Blake, *M.* "*fluviatilis*" Barlow and *M. saligna* Schauer and *L. denticulata* Gagné from *M. quinquenervia* and *M. viridiflora*. The fifth species, *Austrolopesia melaleucae* Kolesik (1999), transforms flowers of *M. halmaturorum* F. Muell. ex Miq. into hard, spherical, hairy galls.

The main character that distinguishes the new species from the otherwise rather diverse species of *Lophodiplosis* Gagné is the conspicuous protuberance on the pupal vertex which is present in the other species but absent in *Lopesia quadrata* sp. nov. The new species differs from *Austrolopesia melaleucae*, a species with which it shares the type locality, in all developmental stages. In *L. quadrata*, the palpi are two-segmented, the tarsal claw has a broad, short tooth, the male flagellomeres are binodal, the ovipositor is short and barely protrusible, the pupal prothoracic spiracle is as long as wide and the larva has no sternal spatula. In *A. melaleucae*, the palpi are four-segmented, the tarsal claw has a thin, long tooth, the male flagellomeres are gynecoid, the ovipositor is long and protrusible, the pupal prothoracic spiracle is several times longer than wide and the larva has a well developed sternal spatula.

Some specimens of the new species had the aedeagus widely opened at its terminal end, a transformation possibly caused by mating.

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